

PATENT COOPERATION TREATY

Patentanwälte

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From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

Eing. 17. Mai 2005

To:

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NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing
(day/month/year)

13.05.2005

Applicant's or agent's file reference
M44295-PCT

IMPORTANT NOTIFICATION

International application No.
PCT/EP 03/12527

International filing date (day/month/year)
10.11.2003

Priority date (day/month/year)
11.11.2002

Applicant
NUVERA FUEL CELLS EUROPE S.R.L. et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/I/B/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

The applicant's attention is drawn to Article 33(5), which provides that the criteria of novelty, inventive step and industrial applicability described in Article 33(2) to (4) merely serve the purposes of international preliminary examination and that "any Contracting State may apply additional or different criteria for the purposes of deciding whether, in that State, the claimed inventions is patentable or not" (see also Article 27(5)). Such additional criteria may relate, for example, to exemptions from patentability, requirements for enabling disclosure, clarity and support for the claims.

Name and mailing address of the International
preliminary examining authority:



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PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Article 36 and Rule 70)

Applicant's or agent's file reference M/44295-PCT	FOR FURTHER ACTION See Notification of Transmittal of International Preliminary Examination Report (Form PCT/PEA/416)	
International application No. PCT/EP 03/12527	International filing date (day/month/year) 10.11.2003	Priority date (day/month/year) 11.11.2002
International Patent Classification (IPC) or both national classification and IPC H01M8/02, H01M8/04, H01M8/24		
Applicant NUVERA FUEL CELLS EUROPE S.R.L. et al.		

<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input checked="" type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 3 sheets.</p>
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"> I <input checked="" type="checkbox"/> Basis of the opinion II <input type="checkbox"/> Priority III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability IV <input type="checkbox"/> Lack of unity of invention V <input checked="" type="checkbox"/> Reasoned statement under Rule 66.2(a)(ii) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement VI <input type="checkbox"/> Certain documents cited VII <input type="checkbox"/> Certain defects in the international application VIII <input type="checkbox"/> Certain observations on the international application

Date of submission of the demand 11.06.2004	Date of completion of this report 13.05.2005
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized Officer Wiedemann, E Telephone No. +49 89 2399-7542

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. PCT/EP 03/12527

I. Basis of the report

1. With regard to the **elements** of the international application (*Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17)*):

Description, Pages

1-17 as originally filed

Claims, Numbers

1-15 received on 26.04.2005 with letter of 26.04.2005

Drawings, Sheets

1.8-8/8 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- the language of publication of the international application (under Rule 48.3(b)).
- the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- contained in the international application in written form.
- filed together with the international application in computer readable form.
- furnished subsequently to this Authority in written form.
- furnished subsequently to this Authority in computer readable form.
- The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:

- the description, pages:
- the claims, Nos.:
- the drawings, sheets:

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT**

International application No. **PCT/EP 03/12527**

5. This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)).

(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)

6. Additional observations, if necessary:

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or Industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N) Yes: Claims 1-15
 No: Claims

Inventive step (IS) Yes: Claims 1-15
 No: Claims

Industrial applicability (IA) Yes: Claims 1-15
 No: Claims

2. Citations and explanations

see separate sheet

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/12527

Re Item V

Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1) Reference is made to the following documents:

- D1: EP-A-0 999 605 (HONDA MOTOR CO LTD) 10 May 2000 (2000-05-10)
- D2: US-A-3 926 676 (FRIE WOLFGANG ET AL) 16 December 1975 (1975-12-16)
- D3: US-A-4 233 146 (KATTERMANN DIETRICH E ET AL) 11 November 1980 (1980-11-11)
- D4: GB-A-1 214 359 (ALLMANNA SVENSKA ELEKTRISKA AKTIEBOLAGET) 2 December 1970 (1970-12-02)

2) Amendments

The amendments filed with the letter dated 26.04.2005 fulfill the requirements of Article 34 (2) PCT. The amendment concerns independent claim 1, which is now a combination of claims 1 and 2 as originally filed.

2) Novelty

The subject-matter of claims 1-15 is considered to be novel, Article 33 (1) and (2) PCT. Document D1 discloses an electrochemical generator with a fluid distribution device inside the generator. The fluid is uniformly delivered to each of the fuel cell units and is uniformly distributed to the active areas of the cells. As can be seen from the Figures 8, 11 and 12 the pressure drop of the distribution or inlet part is not similar to the exhaust or outlet part. Consequently, the pressure drop of the inlet and outlet is asymmetric. Further, the document recognizes the influence of the channel diameter, the length of a channel and the coefficient of friction on the behaviour of the pressure.

Document D2 discloses a electrolytic fluid distribution/cooling system in a fuel cell comprising main inlet and outlet channels and distribution / collecting channels to uniformly distribute the fluid in the active areas. The pressure loss in the respective areas is different, it is smaller in the supply part and higher in the discharge part. Since the document concerns the distribution of electrolyte and not reaction gases, it is not considered to be relevant for novelty.

None of the relevant documents disclose a device for the distribution of reaction gases where the pressure drop in the feed device is lower than in the extraction device.

**INTERNATIONAL PRELIMINARY
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/EP 03/12527

3) Inventive Step

The subject-matter of claims 1-15 is considered to be based on an inventive step, Article 33 (3) PCT.

3.1 The technical problem underlying the present application is considered to establish an asymmetric pressure drop profile between inlet and outlet part of a low pressure fuel cell.

3.2 This problem is solved in a different manner, see D1.

3.3 Document D1 gives no hint, that the asymmetric pressure loss in the reaction gas distribution device (pressure loss in the feed device higher than in the extraction device) would advantageously be reversed.

Document D2 is considered to disclose a different technical field.

4) Industrial Applicability

The subject-matter of the present application is industrially applicable in the field of electrochemical generators.

CLAIMS

1. An electrochemical generator comprised of at least one elementary cell comprising porous current collectors/distributors in correspondence of the active area, a feed device for reactant gases and an extraction device for reaction products and exhausts, wherein the pressure drops localised in the extraction device are substantially higher than said pressure drops localised in the feed device.
2. The generator of claim 1, wherein the feed device comprises a feed manifold and at least one distributing channel and that the extraction device comprises a discharge manifold and at least one collecting channel.
3. The generator of claim 2 wherein said pressure drop localised in the feed device is concentrated within said at least one distributing channel and said pressure drop localised in the extraction device is concentrated within said at least one collecting channel.
4. The generator of the previous claims wherein the pressure inside the current collectors/distributors in correspondence of the active area is substantially equivalent to the pressure in the feed device.
5. The generator of claim 4 wherein the pressure in the feed device is lower than or equal to 1.5 bar abs.

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6. The generator of claims 2 to 5 wherein said at least one collecting channel has a substantially lower passage section than said at least one distributing channel.
7. The generator of claims 2 to 6 wherein said at least one collecting channel has a substantially higher length than said at least one distributing channel.
8. The generator of claims 2 to 7 comprising an amount of said collecting channels lower than the amount of said distributing channels.
9. The generator of the previous claims wherein said at least one elementary cell comprises sealing gaskets provided with centring holes symmetrical with respect to the vertical axis and asymmetrical with respect to the horizontal axis.
10. The generator of claims 2 to 9 wherein said at least one collecting channel is made hydrophobic.
11. The generator of claim 10 wherein said at least one collecting channel is made hydrophobic by applying suspensions of fluorinated polymers.
12. The generator of claim 11 wherein said fluorinated polymers are selected from the group consisting of polytetrafluoroethylene, polyvinylidenefluoride, tetrafluoroethylene-hexafluoroethylene copolymer, perfluoroalcoxy derivates.
13. The generator of claims 2 to 12 wherein said distributing and collecting channels are obtained in the interior of sealing gaskets.

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14. The generator of claims 2 to 12 wherein said distributing and collecting channels are obtained in the interior of bipolar plates delimiting the elementary cells.

15. An electrochemical generator comprised of at least one elementary cell comprising the distinctive features of the description and the drawings